

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Clayey

Site ID: R067BY042CO

Major Land Resource Area: 67B – Central High Plains, Southern Part

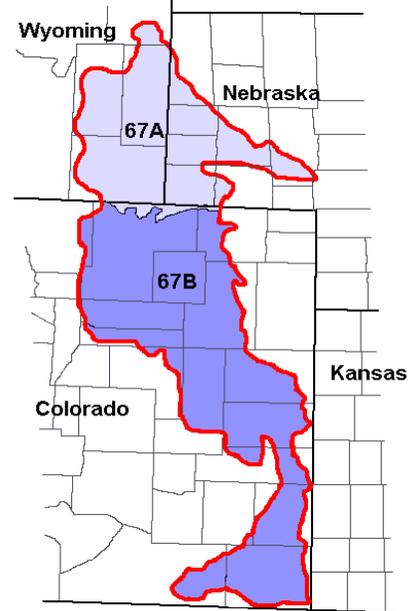
Physiographic Features

This site typically occurs on gently sloping terraces, broad plains, and moderately sloping hills. Some areas are structurally influenced by the presence of shale bedrock within 60 inches of the soil surface.

Landform: terrace, hill, plain

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	3800	5600
Slope (percent):	0	9
Water Table Depth (inches):	60	60
Flooding:		
Frequency:	none	none
Duration:	none	none
Ponding:		
Depth (inches):	0	0
Frequency:	none	none
Duration:	none	none
Runoff Class:	medium	very high



Climatic Features

The mean average annual precipitation varies from 12 to 16 inches per year depending on location and ranges from less than 8 inches to over 20 inches per year. Approximately 75 percent of the annual precipitation occurs during the growing season from mid-April to late-September. Snowfall can vary greatly from year to year but averages 35 to 45 inches per year. Winds are estimated to average about 9 miles per hour annually, ranging from 10 miles per hour during the spring to 9 miles per hour during late summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring periods of high winds with gusts to more than 90 miles per hour.

The average length of the growing season is 142 days, but varies from 129 to 154 days. The average date of first frost in the fall is September 28, and the last frost in the spring is about May 9. July is the hottest month and December and January are the coldest. It is not uncommon for the temperature to exceed 100 degrees F during the summer. Summer humidity is low and evaporation is high. The winters are characterized with frequent northerly winds, producing severe cold with temperatures dropping to -35 degrees F or lower.

Growth of native cool season plants begins about March 15 and continues to about June 15. Native warm season plants begin growth about May 15 and continue to about August 15. Regrowth of cool season plants occurs in September and October of most years, depending on moisture.

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	129	154
Freeze-free period (days):	151	178
Mean Annual Precipitation (inches):	12	16

Average Monthly Precipitation (inches) and Temperature (°F):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.36	12.0	45.1
February	0.26	0.38	15.9	50.9
March	0.83	0.87	22.3	58.9
April	1.28	1.38	30.1	69.1
May	2.32	2.49	39.9	78.0
June	1.93	2.57	49.0	88.7
July	1.42	2.31	55.0	93.9
August	1.07	2.38	53.5	91.9
September	1.02	1.40	43.8	83.8
October	0.89	1.00	32.5	72.9
November	0.52	0.53	20.9	57.4
December	0.34	0.37	11.9	46.9

Climate Stations		Period	
Station ID	Location or Name	From	To
CO0945	Briggsdale	1948	2000
CO4076	Holly	1918	2000
CO9147	Windsor	1948	1990

For local climate stations that may be more representative, refer to <http://www.wcc.nrcs.usda.gov>.

Influencing Water Features

Wetland Description:	<u>System</u>	<u>Subsystem</u>	<u>Class</u>	<u>Sub-class</u>
None	None	None	None	None

Stream Type: None

Representative Soil Features

The soils of this site are moderately deep to very deep, well drained, and slowly to moderately slowly permeable. These soils occur on terraces, hills, and plains. They formed in alluvium and/or slope alluvium derived primarily from shale. The moderately deep soils formed in slope alluvium over residuum derived from shale. The available water capacity is low for moderately deep soils to moderate for very deep soils. The soil surface layer is typically 2 to 20 inches thick and is clay loam, clay, or silty clay. The pH ranges from slightly to strongly alkaline. The clayey subsoil restricts water movement. The soil moisture regime is aridic ustic in the moister areas and ustic aridic in the drier areas. The soil temperature regime is mesic.

The Historical Climax Plant Community (HCPC) should exhibit slight to no evidence of rills, wind scoured areas or pedestaled plants. Water flow paths, if any, are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

Major soil series correlated to this ecological site include: Briggsdale, Campo (clay loam), Colombo, Dalcono, Heldt, Kutch, Limon, Manzanola, Nunn, Rago, Renohill, and Razor.

Other soil series that have been correlated to this site include: none

Parent Material Kind: slope alluvium and/or alluvium over residuum

Parent Material Origin: shale, clayey

Surface Texture: clay loam, clay, silty clay

Surface Texture Modifier: none

Subsurface Texture Group: clayey

Surface Fragments ≤ 3" (% Cover): 0

Surface Fragments > 3" (%Cover): 0

Subsurface Fragments ≤ 3" (% Volume): 0-15

Subsurface Fragments > 3" (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	slow	moderate slow
Depth (inches):	20	80
Electrical Conductivity (mmhos/cm)*:	0	4
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	7.4	9.0
Available Water Capacity (inches)*:	5	8
Calcium Carbonate Equivalent (percent)*:	1	15

*These attributes represent 0-40 inches in depth or to the first restrictive layer.

Plant Communities

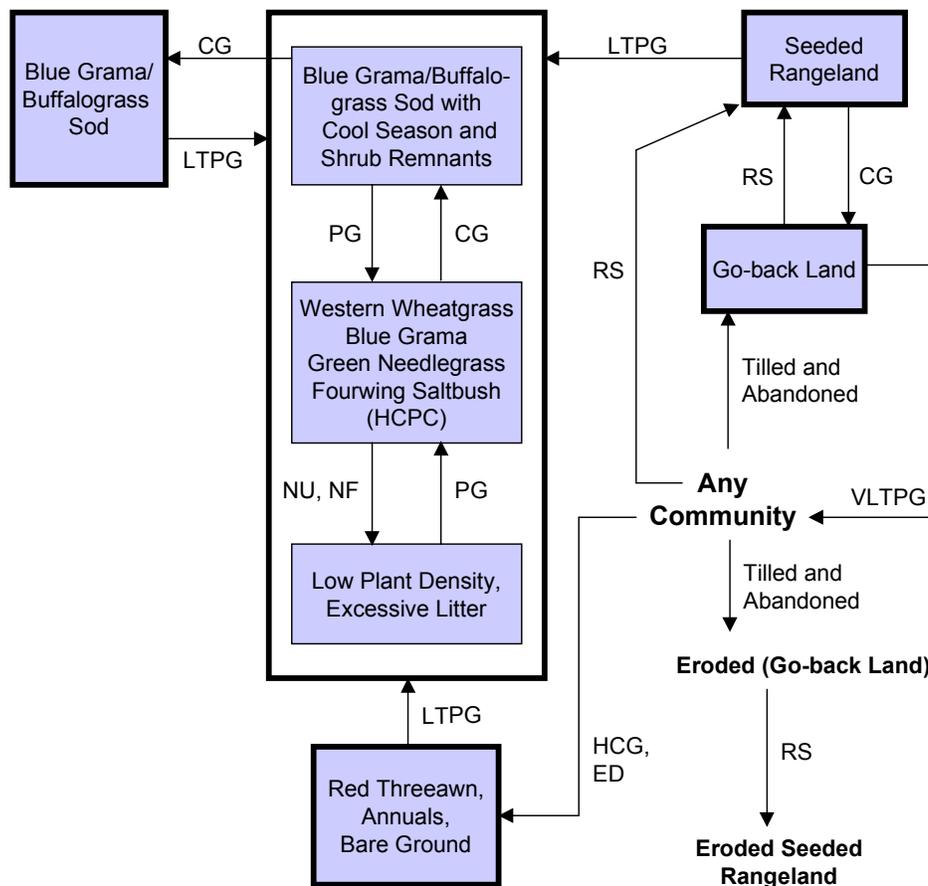
Ecological Dynamics of the Site:

Deterioration of this site, due to continuous grazing without adequate recovery periods following each grazing occurrence, will cause blue grama and buffalograss to increase and eventually become sod bound. Cool season grasses such as green needlegrass and western wheatgrass will decrease in frequency and production as well as key shrubs such as fourwing saltbush and winterfat. American vetch and other highly palatable forbs will decrease also. Red threeawn, annuals and bare ground will increase under heavy continuous grazing. Much of this ecological site has been tilled and used for crop production.

The historic climax plant community (description follows the plant community diagram) has been determined by study of rangeland relic areas, areas protected from excessive disturbance, seasonal use pastures, short duration/time controlled grazing and historical accounts.

The following diagram illustrates the common plant communities that can occur on the site and the transition pathways (arrows) among communities. Bold lines surrounding each plant community or communities represent ecological thresholds. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CG - continuous grazing without adequate recovery opportunity, **ED** - excessive defoliation, **HCG** - heavy continuous grazing, **HCPC** - Historic Climax Plant Community, **LTPG** - long term prescribed grazing (>40 yrs), **NF** - no fire, **NU** - non-use, **PG** - prescribed grazing with adequate recovery period, **RS** - range seeding, **VLTPG** - very long term prescribed grazing (>80 yrs)

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush (HCPC)		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1	700 - 900	70 - 90
western wheatgrass	Pascopyrum smithii	PASM	1	350 - 400	35 - 40
blue grama	Bouteloua gracilis	BOGR2	1	200 - 300	20 - 30
green needlegrass	Nassella viridula	NAV14	1	100 - 200	10 - 20
buffalograss	Buchloe dactyloides	BUDA	1	20 - 50	2 - 5
alkali sacaton	Sporobolus airoides	SPAI	1	0 - 30	0 - 3
bottlebrush squirreltail	Elymus elymoides ssp. elymoides	ELELE	1	0 - 30	0 - 3
sideoats grama	Bouteloua curtipendula	BOCU	1	0 - 30	0 - 3
galleta (south)	Pleuraphis jamesii	PLJA	1	0 - 20	0 - 2
Indian ricegrass	Achnatherum hymenoides	ACHY	1	0 - 10	0 - 1
inland saltgrass (south)	Distichlis spicata	DISP	1	0 - 10	0 - 1
prairie junegrass	Koeleria macrantha	KOMA	1	0 - 10	0 - 1
red threeawn	Aristida purpurea var. longiseta	ARPUL	1	0 - 10	0 - 1
sand dropseed	Sporobolus cryptandrus	SPCR	1	0 - 10	0 - 1
tall dropseed	Sporobolus compositus var. compositus	SPCOC2	1	0 - 10	0 - 1
sun sedge	Carex inops ssp. heliophila	CAINH2	1	10 - 40	1 - 4
needleleaf sedge	Carex duriuscula	CADU6	1	0 - 20	0 - 2
other native grasses		2GP	1	0 - 30	0 - 3
FORBS			2	50 - 150	5 - 15
American vetch	Vicia americana	VIAM	2	30 - 70	3 - 7
purple prairie clover	Dalea purpurea var. purpurea	DAPUP	2	10 - 30	1 - 3
scarlet globemallow	Sphaeralcea coccinea	SPCO	2	10 - 30	1 - 3
dotted gayfeather	Liatris punctata	LIPU	2	10 - 20	1 - 2
blanketflower	Gaillardia pinnatifida	GAPI	2	0 - 10	0 - 1
Fremont goldenweed	Oenopsis foliosa	OFOF	2	0 - 10	0 - 1
hairy goldaster	Heterotheca villosa	HEV14	2	0 - 10	0 - 1
Louisiana sagewort	Artemisia ludoviciana	ARLU	2	0 - 10	0 - 1
plains bahia	Picradeniopsis oppositifolia	PIOP	2	0 - 10	0 - 1
prairie sunflower	Helianthus petiolaris	HEPE	2	0 - 10	0 - 1
rush skeletonplant	Lygodesmia juncea	LYJU	2	0 - 10	0 - 1
scarlet gaura	Gaura coccinea	GACO5	2	0 - 10	0 - 1
silky crazyweed	Oxytropis sericea	OXSE	2	0 - 10	0 - 1
silky sophora	Sophora nuttalliana	SONU	2	0 - 10	0 - 1
slimflower scurfpea	Psoralidium tenuiflorum	PSTE5	2	0 - 10	0 - 1
twogrooved milkvetch	Astragalus bisulcatus	ASB12	2	0 - 10	0 - 1
upright prairie coneflower	Ratibida columnifera	RACO3	2	0 - 10	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	2	0 - 10	0 - 1
woolly locoweed	Astragalus mollissimus	ASMO7	2	0 - 10	0 - 1
other native forbs		2FP	2	10 - 50	1 - 5
SHRUBS			3	50 - 150	5 - 15
fourwing saltbush	Atriplex canescens	ATCA2	3	50 - 100	5 - 10
winterfat	Krascheninnikovia lanata	KRLA2	3	20 - 50	2 - 5
fringed sagebrush	Artemisia frigida	ARFR4	3	0 - 20	0 - 2
broom snakeweed	Gutierrezia sarothrae	GUSA2	3	0 - 10	0 - 1
green plume rabbitbrush	Ericameria nauseosa ssp. nauseosa var. glabrata	ERNAG	3	0 - 10	0 - 1
purple pincushion	Escobaria vivipara var. vivipara	ESVIV	3	0 - 10	0 - 1
plains pricklypear	Opuntia polyacantha	OPPO	3	0 - 10	0 - 1
other native shrubs		2SHRUB	3	10 - 40	1 - 4

Annual Production lbs./acre	LOW	RV*	HIGH
GRASSES & GRASS-LIKES	410	800	-1290
FORBS	45	100	-155
SHRUBS	45	100	-155
TREES			
TOTAL	500	1000	-1600

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. *RV = representative value or annual production of a normal or representative year.

Plant Community Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they probably are the most prevalent and repeatable plant communities. The plant composition table shown above has been developed from the best available knowledge at the time of this revision. As more data is collected, some of these plant communities may be revised or removed, and new ones may be added. None of these plant communities should necessarily be thought of as “Desired Plant Communities”. According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities will be determined by the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for adequate recovery periods following each grazing event.

The plant community consists of 70-90% grasses and grass-likes, 5-15% forbs and 5-15% shrubs. Dominant grasses include western wheatgrass, green needlegrass and blue grama. Other grasses and grass-like plants that occur in minor amounts are buffalograss, sideoats grama and sun sedge. Significant forbs are American vetch, purple prairieclover and scarlet globemallow. Dominant shrubs that occupy this community are fourwing saltbush and winterfat.

This plant community is diverse, stable, and productive. It is well suited to carbon sequestration, water yield, wildlife use by many species, livestock use and is esthetically pleasing. Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. This community is resistant to many disturbances except continuous grazing, tillage and/or development into urban or other uses.

Total annual production, during an average year, ranges from 500 to 1600 pounds per acre air-dry weight and will average 1000 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6701

Growth curve name: Cool season/warm season co-dominant; MLRA-67B; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	8	20	28	15	12	10	5	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery periods between grazing events shifts this plant community toward the *Blue Grama/Buffalograss Sod with Cool Season and Shrub Remnants Plant Community*.
- Non-use and lack of fire will move this plant community toward the *Low Plant Density and Excessive Litter Plant Community*.

- Prescribed grazing that allows for adequate recovery opportunity following each grazing event and proper stocking will maintain the *Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)*.

Blue Grama/Buffalograss Sod with Remnant Cool Season and Shrubs Plant Community

This plant community evolved with continuous grazing without adequate recovery periods between each grazing event during the growing season. Recognition of this plant community will enable the land user to implement key management decisions before a significant economic/ecological threshold is crossed.

Key species such as green needlegrass, western wheatgrass, American vetch, fourwing saltbush and winterfat have been reduced to remnant amounts. Blue grama and buffalograss have increased in abundance, dominate the community, and are beginning to take on a sod appearance. Sand dropseed, red threeawn, sixweeks fescue, bottlebrush squirreltail and hairy goldaster have also increased. This plant community is at risk of losing green needlegrass, western wheatgrass, American vetch, fourwing saltbush and winterfat. Once these key species are completely removed and other plants have increased, it will take a long time to bring them back by management alone. Substantial increases in money and other resources will be required to replace the lost species in a shorter period of time.

Total aboveground carbon has been reduced due to decreases in forage and litter production. Reduction of rhizomatous wheatgrass, nitrogen fixing forbs, shrub component and increased warm season shortgrasses has begun to alter the biotic integrity of this community. Water and nutrient cycles are impaired. This is an early stage of desertification.

Total annual production, during an average year, ranges from 200 to 800 pounds per acre air-dry weight and will average 600 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6702

Growth curve name: Warm season dominant, cool season sub-dominant; MLRA-67B, upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	2	15	45	20	15	3	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery periods between grazing events will shift this plant community across an ecological threshold to a *Blue Grama/Buffalograss Sod Plant Community*. This transition leads to a dramatically altered plant community.
- Prescribed grazing with adequate recovery opportunities between grazing events and proper stocking will bring this community back to the *Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)*.

Excessive Litter, Low Density Plant Community

This plant community occurs when grazing is removed for long periods of time in the absence of fire. Plant composition is similar to the HCPC, however individual species production and frequency will be lower.

Much of the nutrients are tied up in excess litter. The semiarid environment and the absence of animal traffic to break down litter slow nutrient recycling. Aboveground litter also limits sunlight from reaching plant crowns. Many plants, especially bunchgrasses die off. Thick litter and absence of grazing or fire reduce seed germination and establishment.

In advanced stages, plant mortality can increase and erosion may eventually occur if bare ground increases. Once this happens it will require increased energy input in terms of practice cost and management to bring back.

Total annual production can vary from 300 to 1100 pounds of air-dry vegetation per acre and will average 750 pounds during an average year.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6703

Growth curve name: Cool season/warm season co-dominant, excess litter; MLRA-67B; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	10	20	25	15	15	10	5	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Prescribed grazing with adequate recovery periods between grazing events during the growing season will move this plant community toward the *Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)*. This can be a relatively short-term transition depending upon how degraded the plant community has become.

Blue Grama/Buffalograss Sod Plant Community

This plant community evolved with continuous grazing and occurs frequently throughout most of the eastern plains of Colorado. Most of the key grass, forb and shrub species are absent. Western wheatgrass may persist in trace amounts, greatly reduced in vigor and not readily seen. Blue grama and buffalograss dominate the community with a tight “sodbound” appearance. Red threeawn, sand dropseed, sixweeks fescue and hairy goldaster have increased.

This plant community is resistant to change due to grazing tolerance of buffalograss and blue grama. A significant amount of production and diversity has been lost from this community when compared to the HCPC. Loss of cool season grasses, shrub component and nitrogen fixing forbs have negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system “root pan”, characteristic of blue grama and buffalograss. Soil loss may be obvious where flow paths are connected.

It will take a very long time to restore this plant community back to the HCPC with management. Renovation would be very costly. Desertification is advanced.

Total annual production, during an average year, ranges from 100 to 700 pounds per acre air-dry weight and will average 450 pounds.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6707

Growth curve name: Warm season dominant; MLRA-67B; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	3	20	45	20	10	2	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Heavy continuous grazing or excessive defoliation without adequate recovery periods following each grazing event will shift this plant community toward the *Red threeawn, Annuals, Bare Ground Plant Community*. Erosion and loss of organic matter/carbon reserves are concerns.
- Long term prescribed grazing with adequate recovery periods following each grazing event and proper stocking over long periods of time move this plant community toward the *Blue Grama/Buffalograss Sod with Cool Season Remnants Plant Community* and will eventually return to the *HCPC* or associated successional plant communities, assuming an adequate seed/vegetative source is available. This process may take greater than 40 years.

Red Threeawn, Annuals and Bare Ground Plant Community

This plant community develops with heavy continuous grazing and/or occupation by prairie dogs. Red threeawn, curlycup gumweed and annual plants such as sixweeks fescue, cheatgrass and Russian thistle have increased and/or invaded. Blue grama may persist in localized areas. Introduced species such as field bindweed can also be present, especially on prairie dog towns.

This community lacks stability, diversity and productivity. Litter levels are extremely low. Erosion is evident where flow paths are continuous. Rills may occur on steeper slopes. The nutrient cycle, water cycle and overall energy flow are greatly impaired. Organic matter/carbon reserves are greatly reduced. Desertification is advanced.

Total annual production can vary from 50 to 200 pounds of air-dry vegetation per acre and will average 100 pounds during an average year.

The following is an estimated growth curve of this plant community expected during a normal year. Vegetative growth begins earlier in the southern reaches (Baca, Bent, Kiowa, Las Animas and Prowers counties) of MLRA-67B. Vegetative growth will typically be suppressed during the months of June through August in these counties due to higher evapotranspiration rates.

Growth curve number: CO6707

Growth curve name: Warm season dominant; MLRA-67B; upland fine textured soils.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	0	3	20	45	20	10	2	0	0	0

(monthly percentages of total annual growth)

Transitions or pathways leading to other plant communities are as follows:

- Long term prescribed grazing with adequate recovery periods between each grazing event and proper stocking can eventually move this community back to the *Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)* or associated successional plant community stages, assuming an adequate seed/vegetative source exists. This transition will take a long time (40 to 80 years or more) to achieve.
- Range seeding followed by prescribed grazing may be used as an alternative to convert this plant community to a *Seeded Rangeland* community, which can closely resemble the *HCPC* however, at a substantial cost.

Go-back Land

Go-back land is created when the soil is tilled or farmed (sodbusted) and abandoned. All of the native plants are destroyed, soil organic matter is reduced, soil structure is changed and a plowpan or compacted layer is formed. Residual synthetic chemicals often remain from past farming operations and erosion processes are active.

Go-back land evolves through several plant communities beginning with an early annual plant community, which initiates the revegetation process. Plants such as Russian thistle, kochia and other annuals begin to establish. These plants give some protection from erosion and start to build minor levels of soil organic matter. This early annual plant community lasts for two to several years. Red threeawn, sand dropseed and several other early perennials can dominate the plant community for five to eight years or more. Buffalograss establishes next and dominates for many years. Eventually western wheatgrass, blue grama and other natives become reestablished.

Transitions or pathways leading to other plant communities are as follows:

- Very long term prescribed grazing that allows adequate recovery periods following each grazing event and proper stocking will eventually move the plant communities establishing on *Go-back Land* back to the *HCPC* or *Any Community*, assuming an adequate seed/vegetative source is available. This process takes many years (40-80 years or more).
- Range seeding followed with prescribed grazing can be used to convert *Go-back Land* to *Seeded Rangeland*. This is a quick transition requiring a substantial energy and financial inputs.

Go-back Land (eroded)

Eroded go-back land is created where tillage or farming and severe erosion has occurred. If the parent material that the original soil developed from is lost, then another ecosite will evolve. If the same parent material is present, then re-seeding or the slow process of developing soil and vegetation will start by similar processes as shown in the non-eroded *Go-back Land* above. This is a very slow process (100 years or more).

Seeded Rangeland

This plant community can vary considerably depending on how eroded the soil was, the species seeded, the stand that was established, how long ago the stand was established, and the management of the stand since establishment.

Transitions or pathways leading to other plant communities are as follows:

- Continuous grazing without adequate recovery period between grazing events can shift this plant community to a plant community resembling *Go-back Land*.
- Long term prescribed grazing with adequate recovery periods between grazing events will eventually move this plant community toward the *Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community (HCPC)* or associated successional plant communities. This transition can take 40 years or more.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing Saltbush Plant Community-Historic Climax Plant Community (HCPC)

Common bird species expected on the HCPC include Cassin's sparrow, chestnut collared longspur, lark bunting, western meadowlark, and ferruginous and Swainson's hawks. White-tailed and black-tailed jackrabbit, badger, pronghorn, coyote, swift fox, plains pocket gopher, long-tailed weasel, and several species of mice are mammals that commonly use this plant community. Reptiles using this community include western rattlesnake, bullsnake, plains garter snake (if water is in home range), western hognose snake, racer, western box turtle, and six-lined racerunner.

Blue Grama/Buffalograss Sod with Cool Season Remnants Plant Community

The reduction of shrubs and taller grasses in this plant community results in a shift of bird species away from the HCPC birds. Lark bunting, chestnut-collared longspur, and western meadowlark use declines and Cassin's sparrow stop using the community altogether. Habitat conditions are ideal for long-billed curlew. McCown's longspur, burrowing owl, mountain plover, killdeer, and horned lark begin using this community. Ferruginous and Swainson's hawks are frequent users of this community. Most mammals will be the same as in the HCPC, however jackrabbit, black-tailed prairie dog, desert cottontail, and thirteen-lined ground squirrel use will increase because of the changing plant community. Reptiles using this community are the same as in the HCPC.

Excessive Litter, Low Density Plant Community; Blue Grama/Buffalograss Sod Plant Community; Red Threawn, Annuals, Bare Ground Plant Community; and Go-back Land Plant Community

Burrowing owl, mountain plover, horned lark, McCown's longspur, killdeer, and long-billed curlew use these plant communities although mountain plover will avoid areas where slopes are greater than 5 percent. With the exception of the hawk species, no HCPC bird species would be expected in these communities. Jackrabbit, black-tailed prairie dog, thirteen-lined ground squirrel, and desert cottontail rabbit are frequent users of these communities. All other mammal species from the HCPC may use the community. Reptiles using these communities exclusively are short-horned lizard and lesser earless lizard. Other reptiles using these communities include the species listed for the HCPC.

Seeded Rangeland

The wildlife species expected on seeded rangeland would be those listed for the plant community the seeding most resembles.

Other Potential Species

The plains spadefoot is the only common species of frog or toad inhabiting grasslands in Eastern Colorado. This species requires water for breeding. Tiger salamanders may be found on grassland sites, but require a water body for breeding. Either of these species may be found in any plant community if seasonal water requirements are met. Mule and white-tailed deer may use this ecological site, however the shrub cover is too low to provide escape or hiding cover. On ecological site locations near riparian areas, deer will use the vegetation for feeding. Big brown bats will use any plant community on this ecological site if a building site is in the area. The gray wolf, black-footed ferret, and wild bison used this ecological site in historic times. The wolf and ferret are thought to be extirpated from Eastern Colorado. Bison are currently found only as domestic livestock.

Animal Preferences (Quarterly – 1,2,3,4†)

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and Grass-likes							
alkali sacaton	U D D U	N U N N	U D D U	N U N N	N U N N	U D D U	U D D U
blue grama	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D
bottlebrush squirreltail	U D U U	U D U U	U D U U	U D U U	U D U U	U D U U	U D U U
buffalograss	D D P D	D D P D	D D P D	D D P D	D D P D	D D P D	D D P D
galleta	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U	U D D U
green needlegrass	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D
Indian ricegrass	D P D D	D P D D	D P D D	D P D D	D P D D	D P D D	D P D D
inland saltgrass	N U U N	N N N N	N U U N	N N N N	N N N N	N U U N	N U U N
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
red threeawn	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
sand dropseed	U D U N	N U D N	U D U N	N U D N	N U D N	U D U N	U D U N
sideoats grama	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
tall dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
western wheatgrass	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D
needleleaf sedge	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D
sun sedge	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D	U P D D
Forbs							
American vetch	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D	D P P D
blanketflower	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	U U U U
dotted gayfeather	U U D U	U D P U	U U D U	U D P U	U D P U	U U D U	U U D U
Fremont goldenweed	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	U U U U
hairy goldaster	U U D U	N N N N	U U D U	N N N N	N N N N	U U D U	U U D U
Louisiana sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U U U
plains bahia	N N N N	N U U N	N N N N	N U U N	N U U N	N N N N	N N N N
prairie sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
purple prairie clover	U P P D	U P P U	U P P D	U P P U	U P P U	U P P D	U P P D
rush skeletonplant	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	U U U U
scarlet gaura	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U U D U
scarlet globemallow	U D D U	U P P U	U D D U	U P P U	U P P U	U D D U	U D D U
silky crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
silky sophora	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
slimflower scurphea	N N N N	N U U N	N N N N	N U U N	N U U N	N N N N	N N N N
twogrooved milkvetch	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
upright prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U U D U
woolly Indianwheat	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
woolly locoweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
Shrubs							
broom snakeweed	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
fourwing saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
fringed sagebrush	U N N U	U D D U	U N N U	U D D U	U D D U	U N N U	U N N U
plains pricklypear	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
purple pincushion	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
winterfat	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic

† Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists suggested initial stocking rates for cattle under continuous grazing (year long grazing or growing season long grazing) under normal growing conditions however, *continuous grazing is not recommended*. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity.

Plant Community	Production (lbs./acre)	Stocking Rate (AUM/acre)
Western Wheatgrass, Blue Grama, Green Needlegrass, Fourwing (HCPC)	1000	0.32
Blue Grama/Buffalograss Sod w/Remnant Cool Seasons/Shrubs	600	0.19
Blue Grama/Buffalograss Sod	450	0.14
Low Plant Density, Excessive Litter	*	*
Red Threeawn, Annuals, Bare Ground	*	*

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangelands in this area provide yearlong forage under prescribed grazing for cattle, sheep, horses and other herbivores. During the dormant period, livestock may need supplementation based on reliable forage analysis.

* Highly variable; stocking rate needs to be determined on site.

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group D. Infiltration and runoff potential for this site is moderate depending on ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short grasses form a strong sod and dominate the site. Areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to NRCS Section 4, National Engineering Handbook (NEH-4) for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting, hiking, photography, bird watching and other opportunities. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors.

Wood Products

No appreciable wood products are present on the site.

Other Products

None noted.

Supporting Information

Associated Sites

- (067BY002CO) – Loamy (formerly Loamy Plains)
- (067BY036CO) – Overflow
- (067BY045CO) – Shaly Plains

Similar Sites

- (067BY002CO) – Loamy (formerly Loamy Plains)
[surface texture consists of vfstl to sil, higher production]

Inventory Data References

Information presented here has been derived from NRCS clipping data, numerous ocular estimates and other inventory data. Field observations from experienced range trained personnel were used extensively to develop this ecological site description. Specific data information is contained in individual landowner/user case files and other files located in county NRCS field offices.

Those involved in developing this site include: Ben Berlinger, Rangeland Management Specialist, NRCS; Harvey Sprock, Rangeland Management Specialist, NRCS; James Borchert, Soil Scientist, NRCS; Terri Skadeland, Biologist, NRCS.

State Correlation

This site is specific to Colorado (formerly Clayey Plains).

Field Offices

Akron, Brighton, Burlington, Byers, Cheyenne Wells, Eads, Flagler, Fort Collins, Fort Morgan, Greeley, Holly, Hugo, Kiowa, Lakewood, Lamar, Longmont, Simla, Springfield, Sterling

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://hpccsun.unl.edu>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://wcc.nrcs.usda.gov>)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2004. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Andrews, R. and R. Righter. 1992. Colorado Birds. Denver Museum Nat. Hist., Denver, CO. 442 pp.

Armstrong, D.M. 1972. Distribution of mammals in Colorado. Univ. Kansas Museum Nat. Hist. Monograph #3. 415 pp.

Colorado Breeding Bird Atlas. 1998. Hugh Kingery, Ed., Dist. CO Wildlife Heritage Found., P.O. Box 211512, Denver, CO, 80221. 636 pp.

Fitzgerald, J.P., C.A. Meaney, and D.M. Armstrong. 1994. Mammals of Colorado. Denver Museum Nat. Hist. Denver, CO. 467 pp.

Hammerson, G.A. 1986. Amphibians and reptiles in Colorado. CO Div. Wild. Publication Code DOW-M-I-3-86. 131 pp.

Rennicke, J. 1990. Colorado Wildlife. Falcon Press, Helena and Billings, MT and CO Div. Wildlife, Denver CO. 138 pp.

Site Description Approval

/s/

03/25/2004

State Range Management Specialist

Date